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(54) Weft thread preparation device particularly for feeding threads made of metal, nylon and the like to weaving looms

(57) A weft thread preparation device for feeding threads made of metal, nylon and the like to a weaving loom, comprising a rotating drum (1) provided with a plurality of threaded pivots (9) which are arranged circumferentially and can rotate about their own axes as a consequence of the rotation of the drum (1); the rotation of the drum (1), together with the rotation of the threaded pivots (9), being suitable to produce the rotation of a spool (15) of thread in order to unwind the thread (16) from the spool (15) and move the thread (16) along the threaded pivots (9) for subsequently feeding the thread (16) to a weaving loom.

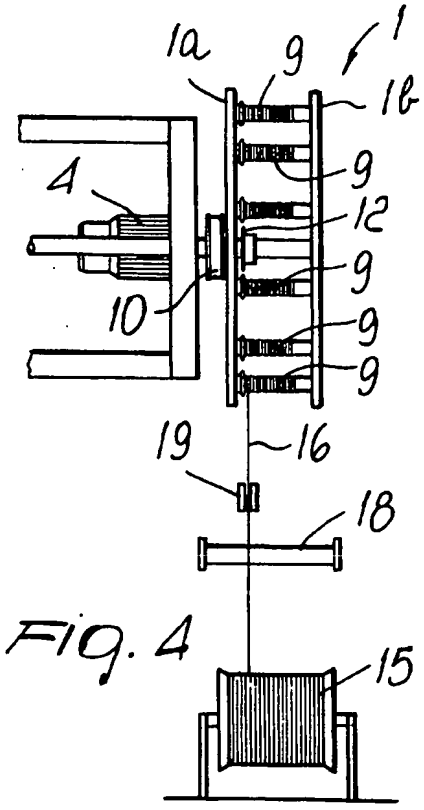

Fig. 4

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Description

The present invention relates to a weft thread preparation device, particularly for feeding threads made of metal, nylon and the like to machines for weaving.

Conventionally, in order to prepare the weft thread used in a textile machine it is necessary to provide a device which takes the thread from a reel or spool on which it is wound in order to then convey it to the weaving loom.

This operation is not difficult if the weft thread to be used is very fine and therefore can be unwound easily from the spool on which it is supplied.

In this case, the thread is not subjected, during unwinding, to permanent deformations that can damage its characteristics.

If instead it is necessary to use as weft thread a thread made of metal, nylon or synthetic fiber which in any case has a significant diameter, the problem arises of correctly feeding the thread from the spool on which it is wound to the weaving loom.

Devices for preparing the weft thread which allow to unwind the thread from the spool and to subsequently feed it to the weaving loom are currently known.

A first conventional kind of device is provided with a fixed drum constituted by two facing parallel disks which are mutually connected by threaded pivots which can rotate about their own axis.

An arm arranged outside the drum unwinds the weft thread from the corresponding spool and winds it on the threaded pivots, which rotate about their own axes under the force applied by the thread and move the thread from one of their ends to the other, where the thread is released from the drum in order to feed it to the weaving loom.

The drawback of this solution is the fact that the arm that winds the thread around the threaded pivots draws said thread from a spool which must be arranged so that its diametrical axis is perpendicular to the region where the weft thread preparation device rests. In this manner, the thread unwinds from the spool by forming spirals which do not allow to feed it correctly to the drum.

The thread also passes from the spool to the drum by means of the arm along a path which is not straight but is instead constituted by a series of curves which entail the forming of bends in the thread which can be permanent if the cross-section of said thread is significant.

In this manner, the weft thread fed to the weaving loom does not have characteristics that allow the loom to provide a fabric of the intended quality or cannot be woven at all.

A second conventional kind of weft thread preparation device is provided with a solid drum which rotates about its own axis and on which the thread taken from the spool is wound.

In this second case, a drawback is that the weft thread mutually overlaps as it is wound on the drum and therefore the subsequent feeding to the weaving loom does not occur uniformly.

The aim of the present invention is therefore to provide a weft thread preparation device for weaving looms which allows to feed the weft thread from the spool on which it is wound to the loom along a direct path without forming bends.

Within the scope of this aim, an object of the present invention is to provide a weft thread preparation device for weaving looms which allows to unwind the thread from the corresponding spool with the spool arranged either horizontally or vertically with respect to the resting surface.

Another object of the present invention is to provide a weft thread preparation device for weaving looms which allows to feed the weft thread in a controlled manner to the weaving loom.

Another object of the present invention is to provide a weft thread preparation device for weaving looms which maintains a substantially constant tension on the thread.

Another object of the present invention is to provide a weft thread preparation device which is highly reliable and relatively easy to provide at competitive costs.

This aim, these objects and others which will become apparent hereinafter are achieved by a weft thread preparation device for feeding threads made of metal, nylon and the like to a weaving loom, characterized in that it comprises a rotating drum provided with a plurality of threaded pivots which are arranged circumferentially and can rotate about their own axes as a consequence of the rotation of said drum; the rotation of said drum, together with the rotation of said threaded pivots, being adapted to produce the rotation of a spool of thread in order to unwind said thread from the spool and move said thread along said threaded pivots for subsequently feeding the thread to a weaving loom.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred but not exclusive embodiment of the device according to the present invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a sectional side view of the weft thread preparation device according to the present invention;
figure 2 is a sectional front view of the drum of the weft thread preparation device according to the present invention;
figure 3 is a front view of the drum of the weft thread preparation device according to the present invention; and
figure 4 is a schematic view of the weft thread preparation device according to the present invention, connected to a spool of thread.

With reference to the above figures, the weft thread

preparation device according to the present invention comprises a drum 1 which is constituted by two parallel facing disks 1a and 1b mutually connected by spacers 2 which are arranged circumferentially.

The drum 1 is keyed on a shaft 3 which is actuated by a motor 4 by means of a driving belt 5 which engages a pulley 10.

The drum 1 is supported by a supporting frame 6 which is constituted by a mounting provided with four arms 7 which protrude from the mounting and are suitable to form four resting points for the drum 1.

At the free end of each arm 7 there is provided a grooved wheel 8 which can rotate with respect to the corresponding arm 7.

Accordingly, a total of four grooved wheels 8 are provided which constitute four supporting points within which the drum 1 rests so that it can rotate freely.

In particular, the outer disk 1b of the drum 1 rests in the grooves of the four grooved wheels 8.

Several threaded pivots 9 are arranged circumferentially and connect the disk 1a to the disk 1b of the drum 1. The thread of the pivots 9 is preferably provided along approximately three quarters of their length. The extension of the screw thread varies according to the number of turns of the thread 16 to be formed on the threaded pivots 9.

The threaded pivots 9 can rotate about their own axis under the effect of the traction applied by kinematic means, as described hereinafter.

Kinematic means, conveniently constituted for example by a chain 11 and by a pinion 12 which is keyed on the shaft 3 and is arranged adjacent to the disk 1a, are provided for rotating the threaded pivots 9.

Each threaded pivot 9 has a pinion 13 which is arranged adjacent to the disk 1a and is adapted to engage the chain 11 for rotating the pivot 9.

The chain 11 is thus arranged so that it passes around each threaded pivot 9 after passing around the pinion 12 in order to receive the motion imparted by the driving shaft 3.

Several sprockets 14 are provided and connected to the disk 1a in a staggered position and internally with respect to the plurality of threaded pivots 9. In this manner, the chain 11 follows a path around each sprocket 14 and each threaded pivot 9, so as to pass internally to each threaded pivot 9 relative to the edge of the disk 1a.

This arrangement allows each threaded pivot 9 to rotate in the opposite direction with respect to the rotation of the drum 1, so as to maintain a correct tension of the weft thread 16 that winds on the threaded pivots 9.

At one of the upper arms 7, on the side where the spool 15 of the weft thread 16 is located, a feeder 17 is provided for passing the weft thread 16 that arrives from the spool 15 to the threaded pivots 9 of the drum 1.

In passing from the spool 15 to the drum 1, the thread 16 passes over a guiding roller 18, through a braking element 19 and finally through the feeder 17.

A microswitch 20 located on the inner face of the disk 1b and actuated by a rod 22 is provided in order to stop the rotation of the drum 1 and therefore the unwinding of the thread 16 from the spool 15. The microswitch 20 has a contact which is grounded on a disk which is rigidly coupled to the driving shaft 3.

Finally, the disk 1b is circumferentially provided with a groove for the exit of the thread 16 and for subsequently sending it to a weaving loom (not shown). A retaining ring 21, made for example of rubber, is provided in the groove in order to brake the exit of the weft thread 16.

With reference to the above figures, the operation of the weft thread preparation device according to the present invention is as follows.

The drum 1, keyed on the shaft 3, is rotated by the belt 5, which engages the pulley 10 which is rigidly coupled to the shaft 3 by means of the motor 4, and the rotation of the drum 1 allows the weft thread 16 to unwind from the corresponding spool 15 located at the base of the device according to the present invention. The thread 16 unwound from the spool 15 winds on the threaded pivots 9, which are in turn rotated by the chain 11, meshing with the pinion 12.

It should be noted that the rotation of the drum 1 allows the thread 16 to unwind from the spool 15 without forming spirals, as usually occurs when the spool 15 is arranged so that its diametrical axis is perpendicular to the resting region.

The rotation of the threaded pivots 9 (in the opposite direction with respect to the rotation of the drum 1) causes the weft thread 16 to move along the screw thread of the pivots 9 in order to pass from a position in which it is adjacent to the disk 1a to a position in which it is adjacent to the disk 1b, from which it then exits through the groove formed in the disk 1b.

The translatory motion of the weft thread 16 along the threaded pivots allows each turn of the drum 1 to wind the thread 16 on the pivots 9. When a preset number of turns of thread has been wound onto the pivots 9, the weight of the thread that bears on the rod 22 causes said rod to move down so as to close the contact on the microswitch 20, thus stopping the further rotation of the drum 1 and accordingly of the threaded pivots 9.

This is done in order to match the speed at which the weft thread 16 unwinds from the spool 15 with the speed at which said weft thread is taken up by the weaving loom through the disk 1b of the drum 1.

In practice it has been observed that the device according to the present invention fully achieves the intended aim, since it allows to prepare the weft thread, unwinding it from the corresponding spool, and to send it to the weaving loom along a substantially straight path without making the thread form undesirable bends and thus without damaging said thread.

The spool on which the weft thread is initially wound can also be arranged so that its diametrical axis is parallel to the resting area of the device, so that the passage of the thread from the spool to the drum occurs

along a substantially straight path.

Finally, the sensor for detecting the accumulation of weft thread on the drum allows to stop the rotation of the drum when the weft thread on it has reached a preset number of turns, so as to match the unwinding of the thread from its spool with the speed with which said thread is taken up by the weaving loom.

The device thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

Thus, for example, in the figures the spool 15 is shown arranged so that its diametrical axis is parallel to the resting region, but as mentioned, in the case of fine threads (wherein formation of spirals does not entail problems, since the thread is supple) it is possible to arrange the spool 15 so that its diametrical axis is perpendicular to the resting region.

The chain 11 for rotating the threaded pivots 9 is also shown to pass on the inside of said pivots with respect to the peripheral rim of the disk 1a that constitutes one of the faces of the drum 1 and on which the chain 11 is arranged. Although this arrangement has been found to ensure optimum tensioning of the thread 16, making the threaded pivots 9 rotate in the opposite direction with respect to the drum 1, it is nonetheless possible to pass the chain 11 on the outside of the threaded pivots 9, so as to make them rotate in the same direction as the drum 1 (this alternative is not shown in the various figures).

In this case, the pitch of the screw thread of the threaded pivots 9 is orientated in the opposite direction with respect to the one shown in the figures.

Finally, all the details may be replaced with other technically equivalent elements.

In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A weft thread preparation device for feeding threads made of metal, nylon and the like to a weaving loom, characterized in that it comprises a rotating drum (1) provided with a plurality of threaded pivots (9) which are arranged circumferentially and can rotate about their own axes as a consequence of the rotation of said drum (1); the rotation of said drum (1), together with the rotation of said threaded pivots (9), being suitable to produce the rotation of a spool (15) of thread in order to unwind said thread (16) from the spool (15) and move said thread (16) along said threaded pivots (9) for subsequently feeding the thread (16) to a weaving loom.

2. A weft thread preparation device according to claim 1, characterized in that said drum (1) comprises a first disk (1a) and a second disk (1b) which face each other, are mutually parallel and are mutually connected by spacers (2).

3. A weft thread preparation device according to claim 2, characterized in that said drum (1) is keyed on a shaft (3) which is driven by a motor (4) by means of a belt-and-pulley drive (5,10).

4. A weft thread preparation device according to claim 2, characterized in that each one of said plurality of threaded pivots (9) comprises a pinion (13) which is arranged adjacent to said first disk (1a).

5. A weft thread preparation device according to claim 4, characterized in that it comprises kinematic means (11,12) which are connected to said shaft (3) and respectively to the pinion (13) of each one of said plurality of threaded pivots (9), said kinematic means (11,12) being suitable to rotate said threaded pivots (9) simultaneously with the rotation of said drum (1).

6. A weft thread preparation device according to claim 5, characterized in that said kinematic means comprise a pinion (12), which is keyed on said shaft (3) and is adjacent to said first disk (1a), and a chain (11), adapted to mesh with said pinion (12) and with the pinions (13) of said plurality of threaded pivots (9).

7. A weft thread preparation device according to claim 6, characterized in that said kinematic means also comprise a plurality of sprockets (14) which are arranged so that they are alternated and staggered with respect to said plurality of threaded pivots (9), said chain (11) being arranged so as to engage said sprockets (14) and said pinions (13) of the threaded pivots (9).

8. A weft thread preparation device according to claim 1, characterized in that it comprises means (20,22) for locking the rotation of said drum (1) which are arranged on said drum (1) and are suitable to interrupt its rotation when a certain number of turns of thread (16) on said threaded pivots (9) is reached.

9. A weft thread preparation device according to claim 8, characterized in that said locking means comprise a microswitch (20) actuated by a rod (22) which is arranged on said drum (1) in a position which is adjacent to one of said threaded pivots (9).

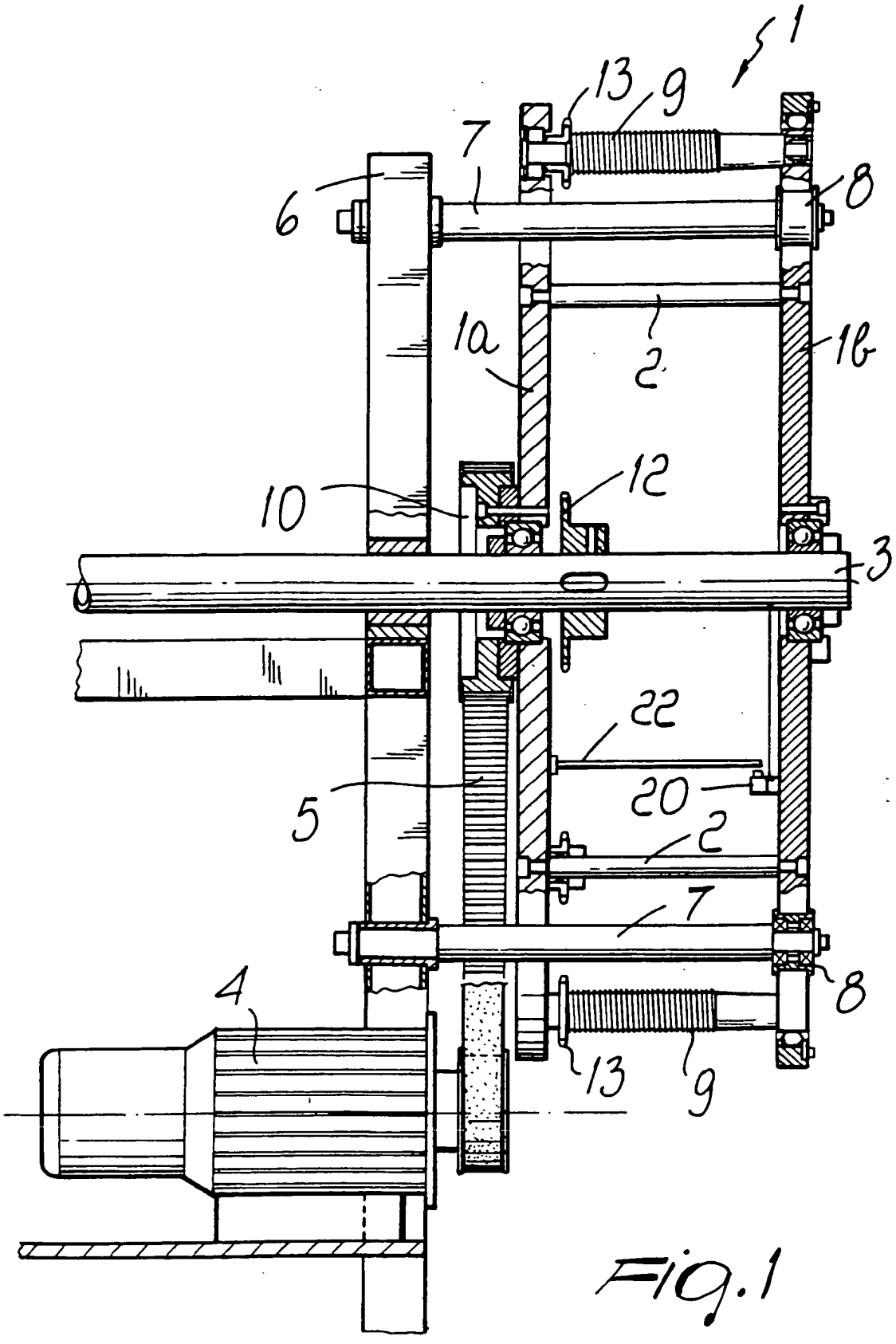

Fig.1

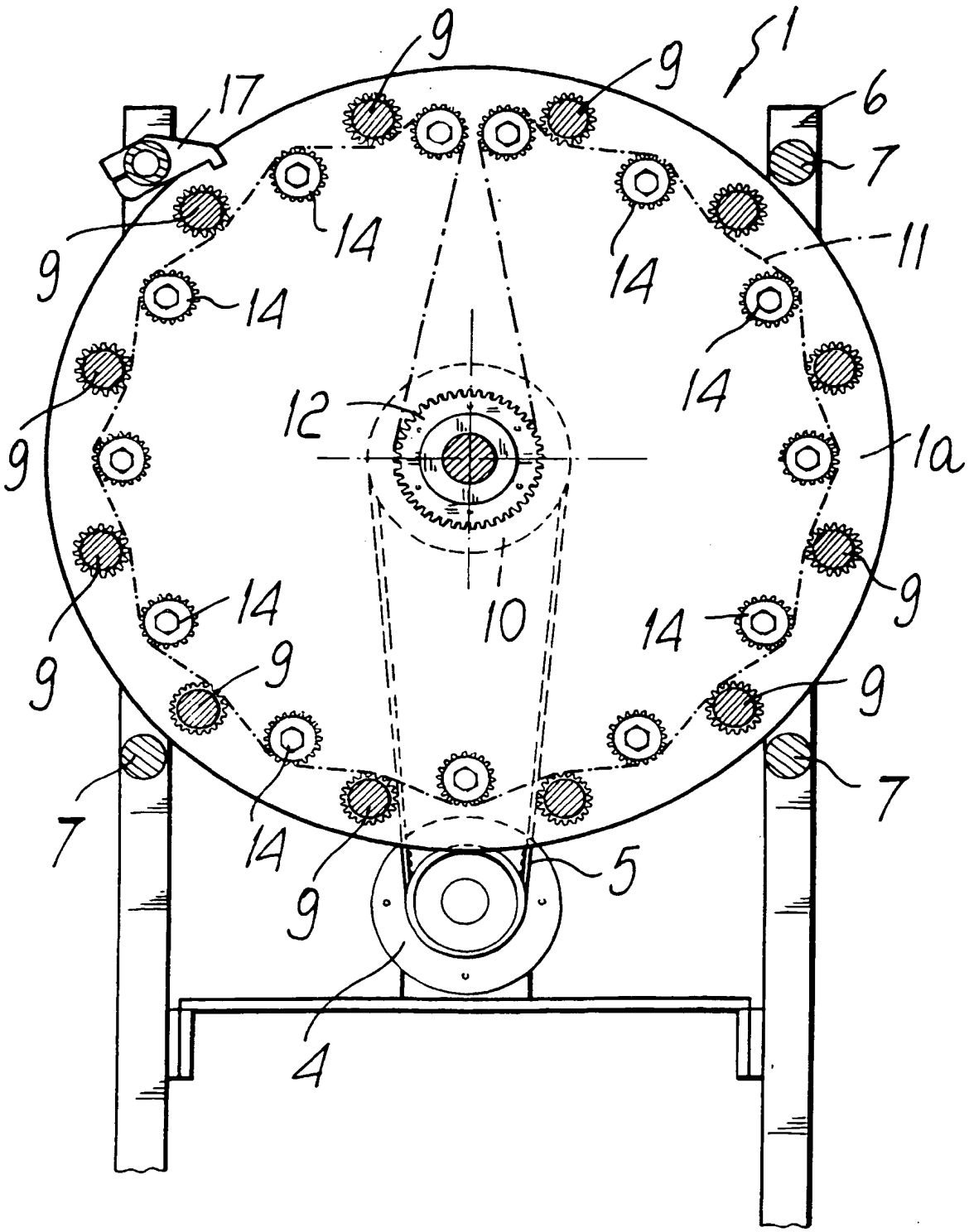

FIG. 2

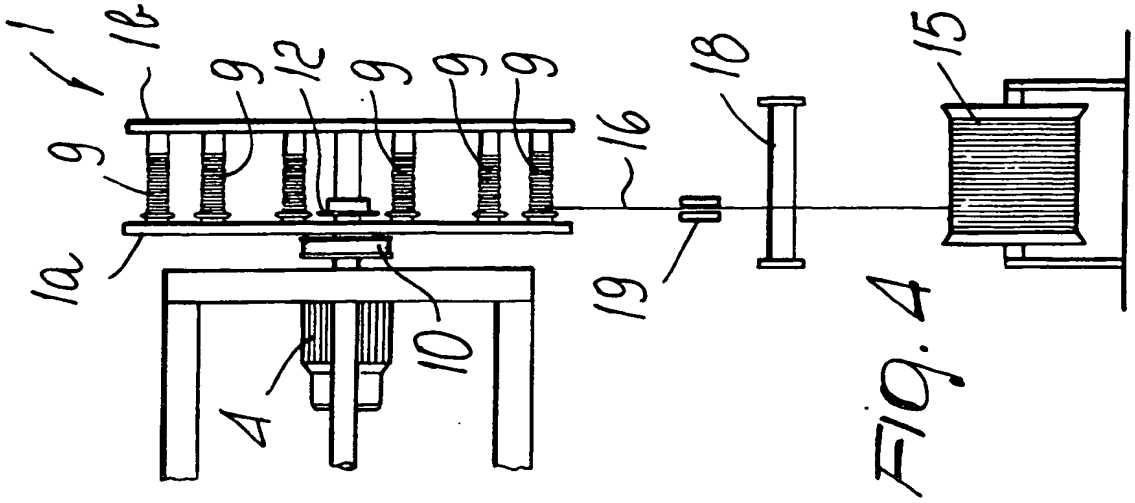

Fig. 4

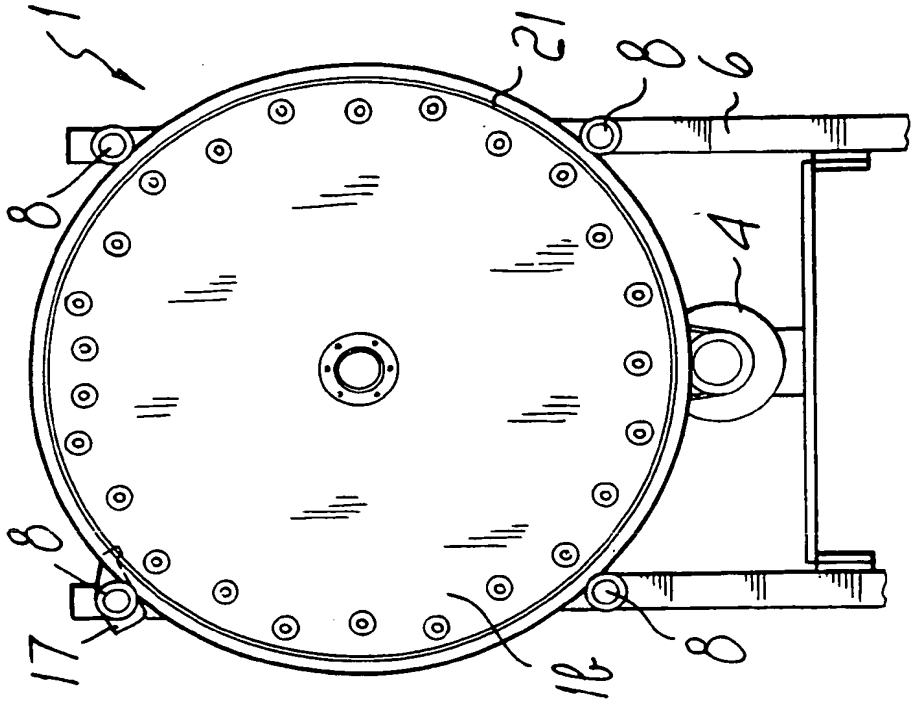

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 2124

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 2 605 536 A (LITZLER) 5 August 1952 * column 5, line 36 - line 74; figures 1-3 * ---	1,3-6	D03D47/34 B65H51/22
A	US 2 609 587 A (KULJIAN) 9 September 1952 * the whole document * ---	1	
A	US 4 026 484 A (NAEGELI WERNER) 31 May 1977 * column 4, line 60 - column 5, line 43; figure 1 * ---	1	
A	US 3 774 384 A (RICHTER H) 27 November 1973 ---		
A	DE 30 38 642 A (VYSOKA SKOLA STROJNI TEXTILNI) 13 August 1981 -----		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
D03D B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 June 1998	Rebiere, J-L

CATEGORY OF CITED DOCUMENTS

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